computer processing apparatus 2, 4.

Calibration pattern store 37 stores data defining different patterns of features to be printed or displayed on the photographic mat. As will be described in more detail below, the subject object(s) for which a three-dimensional computer model is to be generated is placed on a photographic mat 24 printed by printer 18 or on the display panel 19 on which the photographic mat is displayed, and images of the subject object(s) and photographic mat are recorded at different positions and orientations and processed to generate the 3D computer model.

In this embodiment, data is stored in calibration pattern store 37 defining patterns comprising spatial clusters of features for example as described in copending PCT Patent Application GB00/04469 (WO-A-01-39124) (the full contents of which are incorporated herein by cross-reference), patterns comprising concentric circles connected by radial line segments with known dimensions and position markers in each quadrant, for example as described in "Automatic Reconstruction of 3D Objects Using a Mobile Camera" by Niem in Image and Vision Computing 17 (1999) pages 125-134, patterns comprising

concentric rings with different diameters, for example as described "The Lumigraph" by Gortler et al in Computer Graphics Proceedings, Annual Conference Series, 1996 ACM-0-89791-764-4/96/008, and patterns comprising coloured dots with each dot having a different hue/brightness combination so that each respective dot is unique, for example as described in JP-A-9-170914.

By way of example, Figure 2 shows a pattern of features comprising spatial clusters of features as described in co-pending PCT patent application GB00/04469 (WO-A-01-39124).

Referring to Figure 2, the pattern comprises a plurality of clusters 100-128. Each cluster comprises four features, which, in this example, are black circles.

Each feature has one of two areas, that is, either large or small, with a large feature having an area twice the area of a small feature.

Within each cluster 100-128, the centres of the four circles are arranged on an imaginary straight line (that is, a line not present on the printed or displayed photographic mat - indicated at 130 for cluster 100 and

140 for cluster 104) with each straight line being a radius of the same circle. Accordingly, a line through the centre of the circles in a given cluster passes through the centre 150 of the circle.

In this embodiment, the clusters 100-128 are arranged around a central blank area 160 defined by a circle 162.

When processing an image of a subject object on a photographic mat having the pattern shown in Figure 2, each black circle in the pattern can be uniquely identified by detecting four circles which lie on a radial straight line, and by determining the relative sizes and positions of the circles within the cluster of four (thereby uniquely identifying the cluster and each circle therein). Accordingly, by identifying the features on the photographic mat and their relative positions in an image, the imaging position and orientation can be determined. This processing is described in detail in copending PCT application GB00/04469 (WO-A-01-39124).

Other suitable patterns and the processing associated therewith are described in "Automatic Reconstruction of 3D Objects Using a Mobile Camera" by Niem in Image and